

Review of Discussion Paper, No. 2018-15, “Improving quality of life through sustainable energy and urban infrastructure in Africa” by Shingirirai S. Mutanga and co-authors

This discussion paper contains some very important proposals for how the G20 could stand up to its responsibility towards Africa. However, the text needs to be written with more care to structure and scientific standards. In addition, it could do more to highlight the solutions and opportunities available within the continent and thus add a hopeful touch to the somewhat grim picture painted of Africa so far.

Major comments:

1. The structure of the paper is not sufficiently clear, sometimes difficult to follow and inconsistent. For example, some headlines include a clear proposal (“Getting incentives right”) while other are a bit unspecific (“A forward looking approach to energy infrastructure development”). In addition, many claims go without any kind of support (“the expansion of the electricity grid and promotion of off-grid electricity services will have to proceed hand in hand.”). I suggest (i) using a consistent style across all proposals and (ii) combine crisp proposals with a convincing explanation. A good example for structure is proposal 3 where a general proposal (“Level the playing field for a low carbon energy transformation”) is followed by a more specific proposal (“Getting incentives right”) and finally an explanatory text with references.
2. Proposal 4 is quite weak in terms of content. Formulations are overly generic and simple (“address the needs of the population living in slums”). As a text coming from the scientific community it should focus much more on which specific insights are coming from science. The section could be written by anyone with a decent general education. A formulation like “ban of certain vehicles types and emission standards” appears to be completely arbitrary: Wouldn’t emission standards make vehicle bans redundant? If not, why? It is also unclear what would be the specific role of the G20 in the proposed solutions.
3. I agree that challenges in Africa are staggering and that outside support would be very valuable. But this could be complemented with a mention of the potential within the continent. There is an important expertise and motivation in Africa to combine development with sustainability (Ohunakin et al. 2014; Walwyn and Brent 2015). In addition, Africa may be able to achieve ambitious climate policy at zero net cost (Leimbach et al. 2018). Given this and similar examples, the role of the G20 would be to support the solutions available within the continent.
4. Recent publications have claimed that it would be optimal for Africa to add new energy capacity exclusively from renewable sources (IRENA 2015; Ueckerdt et al. 2017, fig. 10). I think this paper should take a stance on whether or not this is a reasonable approach and what could be the contribution of the G20 to it.

Minor comments:

1. Check your references. Some references like Duff (2011) and Doig and Adow (2011) are not listed.
2. Schwerhoff and Sy (2016) can be updated to (Schwerhoff and Sy 2017)
3. GHG is a common abbreviation, but you should introduce it nevertheless.

4. I'm not sure if the title is a good fit. That energy and infrastructure are important for development is a bit trivial. Maybe something pointing in the direction of leapfrogging, that is a sustainable form of providing energy and infrastructure, could be more precise in describing the content.
5. In the context of point 2 (urbanization) I think it would be important to briefly address population growth, because it interacts in obvious ways with urbanization rates and city growth. In addition, it could be mentioned how your proposals may affect the population growth rate (thus either worsening the pressure or reducing it).
6. The section "Mitigate the economic risks of climate change by supporting African low-carbon development pathways" is not convincing as it stands.
 - a. The first and second paragraph could you references to back up key claims.
 - b. I'm not convinced of the relevance of cooling. Putting large parts of the African population in air-conditioned rooms seems hardly achievable and it is unclear how the content would keep its economy running in this case.
 - c. According to the literature, clean cook stoves are important for health, but do they make a quantitatively important contribution to either climate mitigation or adaptation?
7. There are two Quitzow et al. (2016). This should be distinguished.
8. Of the 36 references 16 are not peer-reviewed. It would increase the strength of the arguments if some of the grey literature is replaced with peer-reviewed articles.

References

- IRENA. 2015. "Africa 2030: Roadmap for a Renewable Energy Future." Abu Dhabi: IRENA.
<http://www.irena.org/publications/2015/Oct/Africa-2030-Roadmap-for-a-Renewable-Energy-Future>.
- Leimbach, Marian, Niklas Roming, Anselm Schultes, and Gregor Schwerhoff. 2018. "Long-Term Development Perspectives of Sub-Saharan Africa under Climate Policies." *Ecological Economics* 144 (February): 148–59. <https://doi.org/10.1016/j.ecolecon.2017.07.033>.
- Ohunakin, Olayinka S., Muyiwa S. Adaramola, Olanrewaju. M. Oyewola, and Richard O. Fagbenle. 2014. "Solar Energy Applications and Development in Nigeria: Drivers and Barriers." *Renewable and Sustainable Energy Reviews* 32 (April): 294–301. <https://doi.org/10.1016/j.rser.2014.01.014>.
- Schwerhoff, Gregor, and Mouhamadou Sy. 2017. "Financing Renewable Energy in Africa – Key Challenge of the Sustainable Development Goals." *Renewable and Sustainable Energy Reviews* 75 (August): 393–401. <https://doi.org/10.1016/j.rser.2016.11.004>.
- Ueckerdt, Falko, Robert Pietzcker, Yvonne Scholz, Daniel Stetter, Anastasis Giannousakis, and Gunnar Luderer. 2017. "Decarbonizing Global Power Supply under Region-Specific Consideration of Challenges and Options of Integrating Variable Renewables in the REMIND Model." *Energy Economics* 64: 665–84.
- Walwyn, David Richard, and Alan Colin Brent. 2015. "Renewable Energy Gathers Steam in South Africa." *Renewable and Sustainable Energy Reviews* 41 (C): 390–401.